

METAMORPHOSES OF CUBAN NYMPHALIDÆ
AND LYCAENIDÆ¹

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This paper is intended to supplement an earlier communication on the immature stages of Cuban diurnal Lepidoptera (Dethier, 1940). The three species of Nymphalidæ and single species of Lycænidæ described below are four very common members of the Cuban fauna. Nevertheless, their early stages and oviposition habits are but imperfectly known.

Precis zonalis Felder & Felder

Egg. Biscay green. Height .75 mm. Greatest diameter .65 mm. Eleven raised longitudinal ribs. In general appearance the egg resembles those of species of *Anartia*. It is nearly round but seems squat due to the fact that the base is perfectly flat and the section of greatest diameter is nearer the base than the apex. The ribs are raised a greater height from the surrounding surface at the apex than elsewhere. The surface of the egg applied to the plant is made up of microscopic polygonal areas.

First Instar. Head height .4 mm.; head width .4 mm. Smooth, shiny, and nearly black. There are a few long scattered hairs of the same color. The arrangement of these hairs is shown in Plate V Figure 1. The spherical nature of the head and the shallowness of the apex are also shown. Body 2.5 mm. long. Amber yellow. The transparency of the integument allows the green coloring of plant material in the gut to be seen. Few long scattered black hairs. Most of these are recurved forward. No branched spines are present in this instar. The thoracic legs are the same color as the head. Spiracles same color as body.

Second Instar. Head height .6 mm.; head width .6 mm. Shiny black. Same shape as in previous instar. Hairs more

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numerous. Body 4.5 mm. long. Amber yellow suffused with green dorsally. Large branched spines present. A mid-dorsal row of spines occurs on the abdominal segments. A para-dorsal row occurs on all segments but the first thoracic, a suprastigmatal row on the third thoracic and all abdominal segments, a substigmatal row on all segments but the first thoracic, and a prespiracular spine on the prothoracic segment. The thoracic spines are the largest. All spines and their spinules are black. All legs black. Spiracles amber yellow.

Third instar. Head height .8 mm.; head width .9 mm. Shiny black. Surface smooth. Black hairs more numerous. Two small spines at apex bearing two large spinules and several small ones. Head now much wider in appearance. The distribution and relative lengths of the hairs are shown in Plate V Figure 5. Body 6.5 mm. long. Legs black. Body deep slate-olive. On the first thoracic segment and at the bases of the suprastigmatal and substigmatal spines there is a suffusion of buff-yellow. There is a slight tendency toward the same on the dorsal side of the anal segment. Ventral surface buff-yellow. Spines black. Spiracles buff-yellow.

Fourth Instar. Head height .9 mm.; head width 1.1 mm. Head similar to the previous instar with the following exceptions: hair sockets yellow, clypeus yellow. Body 7.5 to 8 mm. long. Deep slate-olive dorsally. Abdominal legs and underside buff-yellow. Anal segment and prothoracic segment suffused with buff-yellow dorsally. Spines and spinules black. Arranged as in previous instar (cf. Plate VI Figure 7). Spiracles buff-yellow.

Eggs laid July 13 hatched three days later, July 16. Each instar required three days. The first moult took place July 19, the second July 22, and the third July 25. Eggs were laid on either side of the leaves of *Lippia*. The female usually came to rest on the top of small plants with the result that eggs were seldom found anywhere but at this position.

Anartia jatrophae jamaicensis Moeschler

Egg. Primrose yellow. Height .75 mm. Greatest diameter .60 mm. The egg of this species appears less squat than

that of *A. lytrea chrysopelea* due to the fact that its height surpasses its diameter. There may be eleven or twelve longitudinal ribs. The same female may lay eggs of both types. In all other respects the eggs resemble those of the next species.

First Instar. Head height .3 mm.; head width .38 mm. Head shiny piceous. Nearly round. Few scattered black hairs. Plate V Figure 3 shows the locations and distribution of these hairs. Body 2 mm. long. Color before eating primrose yellow. After eating, parrot green. First abdominal segment orange. Body covered with scattered hairs arising from brown sclerites. Hairs long and microscopically serrate. Dorsally located hairs black. Forwardly recurved. Those below the subventral fold transparent and backwardly recurved. The distribution of the hairs dorsal to the subventral fold on the prothoracic segment is shown in Plate VI Figure 1. On the cervical shield are located four pairs of hairs. Three of these are in a transverse line on the anterior edge of the shield. The fourth is on the posterior edge. Ventral to the shield proper is a sclerite bearing two hairs directed downward. The more anterior one is longer. The prespiracular wart bears a single hair. In the subventral position are located two small transparent hairs of equal length. Both are directed downward. The arrangement of the hairs on the fourth abdominal segment is shown in Plate VI Figure 2. Hairs i, iii, and v are in a straight line and ii, iv, vi, vii, viii in a straight line on the posterior edge of the segment. v is ventral and slightly anterior to the spiracle. iv is directly posterior to the spiracle. Hairs i to v are long and conspicuous. Hairs vi to viii are minute. Spiracles same color as body. Rimmed with fuscous.

Second Instar. Head height .5 mm.; head width .55 mm. Head shiny piceous, nearly black. Region of ocelli black. Large branched spines on apex of head slightly lighter in color than the surrounding surface. Spine stouter and more swollen distally than in the next species. Plate V Figure 6 shows the arrangement of the hairs of the head in this instar. Body 3.75 mm. long. Parrot green. Now covered with large black branched spines. These are distributed as

follows: a mid-dorsal row on all abdominal segments, a para-dorsal row on all segments (Plate VI Figure 6) but the prothoracic where there is a group of hairs, a suprastigmatal row on all segments, and a substigmatal row on all segments but the prothoracic. Here there is a prominent prespiracular spine. Spiracles same as before.

Eggs laid July 14 hatched four days later, July 18. The first instar required four days for completion; the second instar, four days. The food plant is *Lippia*.

Anartia lytrea chrysopelea Hbn.

Egg. Light chalcedony yellow. Height .60 mm. Greatest diameter .75 mm. The greatest diameter lies nearer the base than the apex. Eleven raised longitudinal ribs. These project a greater height from the surrounding surface at the apex of the egg than elsewhere. In profile they present a serrated appearance. This is not so evident as in the egg of *Metamorpha stelenes insularis* (Holland). The ribs are joined by many microscopic parallel cross striations which at the apex of the egg form the micropyle rosette and at the base are replaced by polygonal areas.

First Instar. Head height .3 mm.; head width .38 mm. Head shiny, light yellow green. Region of ocelli dark brown. Region of future head tubercles light brown. Few transparent hairs scattered over head. Body 2 mm. long. General color light yellow almost cream. First abdominal segment very dark maroon dorsally. Body covered with long microscopically serrate hairs. The basal two thirds of the dorsal prothoracic hairs are black, the distal ends transparent and colorless. The remaining dorsal hairs of the body are black on the basal third. All dorsal hairs forwardly recurved. Hairs below the subventral fold backwardly recurved. The arrangement of the hairs on the prothoracic segment is shown in Plate VI Figure 3. Along the anterior edge of the cervical shield are four pairs of long forwardly recurved hairs arranged in a transverse line. Slightly posterior to the most lateral one and approximately dorsal to the spiracle is a short hair. There are two prespiracular hairs and the usual two hairs in the subventral position. The arrangement of the hairs on the fourth abdominal seg-

ment is shown in Plate VI Figure 4. Hairs i and iii lie at the anterior edge of the segment in a position more anterior than the spiracle. iv is posterior to the spiracle and v ventral to it. ii, iv, vi, vii, and viii lie in a line along the posterior edge of the segment. The hairs do not arise from conspicuous sclerotized areas as in the preceding species. Legs same color as body. Spiracles with brown rims. Crochets uniorbital forming an ellipse.

Second Instar. Head height .5 mm.; head width .575 mm. Head smooth, clear chalcedony yellow. The spines and the region of the ocelli are dark brown to black. Plate V Figure 2 shows the head spines and the distribution of the hairs. Body 2.5 to 3 mm. long. Chalcedony yellow. Covered with large branched spines. Green from gut visible. Legs and spiracles same as in previous instar.

Third Instar. Head height .7 mm.; head width .9 mm. Similar to second instar. Head spines longer and more conspicuous (Plate VI Figure 11). Body 5 mm. long. Shiny empire green. Spines conspicuously black. Distribution of spines same as in previous instars.

Fourth Instar. Head height 1 mm.; head width 1.2 mm. Head similar to previous instars. Lateral and ventral areas slightly suffused with green. Body 6 mm. long. Same color as before. Spines larger. Large branched substigmatal spines occur on all but the prothoracic segment. Here there is a prominent prespiracular spine (Plate VI Figure 5). Suprastigmatal branched spines occur on all segments. Those on the prothoracic and mesothoracic segments are more postspiracular in position. Branched para-dorsal spines occur on all but the first thoracic segment. The para-dorsal spine on the second thoracic segment is much reduced (Plate VI Figure 8). Mid-dorsal spines are found on all the abdominal segments. The surface of the body is finely rugose. The rugosities are deep maroon in color against a yellowish surface background. The green color of the body is due in great part to the color in the viscera. Legs same color as body. Spiracles with black rims.

Eggs laid July 8 hatched July 12, four days later. The first instar required two days with moulting taking place July 14. The second instar required three days with moults

occurring July 17. The third instar required five days moulting occurring July 22. The female oviposited on species of *Tradescantia* and on *Lippia*.

The former was probably chosen by the female in error due to its proximity to the food plant. Larvæ would not feed on it.

Eumæus atala Poey

The larva and chrysalis of this species have been described in part by Scudder (1875). The following account deals primarily with the arrangement of setæ and body colors, aspects not previously considered.

Last Instar. Head height 2 mm.; head width 2.5 mm. Head yellowish. Few minute scattered hairs. The distribution of these is shown in Plate V Figure 4. On the head the primary and secondary setæ are indistinguishable. They are of little diagnostic value since they vary so greatly in number and position. Plate VI Figures 9 and 10 illustrate the marked variation in the distribution of these head setæ in different specimens of this species. The apex of the head is deeply indented. Surface smooth. Body 20 mm. long. General color brilliant crimson. First and last segments yellowish. Legs, prolegs, and para-dorsal spines yellow. Spiracles light brown, spherical. Para-dorsal row of fleshy tubercles on every segment. Each bears three to five stiff black spines. The para-dorsal tubercles on the first and last body segments are not distinct. Body covered with much short brown secondary hair. A substigmatal row of fleshy protuberances crimson in color. Prothoracic segment enlarged. Crochets triordinal, numbering approximately thirty-three. Arranged in one interrupted band with a spatulate fleshy lobe arising near the interruption.

Chrysalis. Length 15 mm. General color sienna. Scattered brownish spots.

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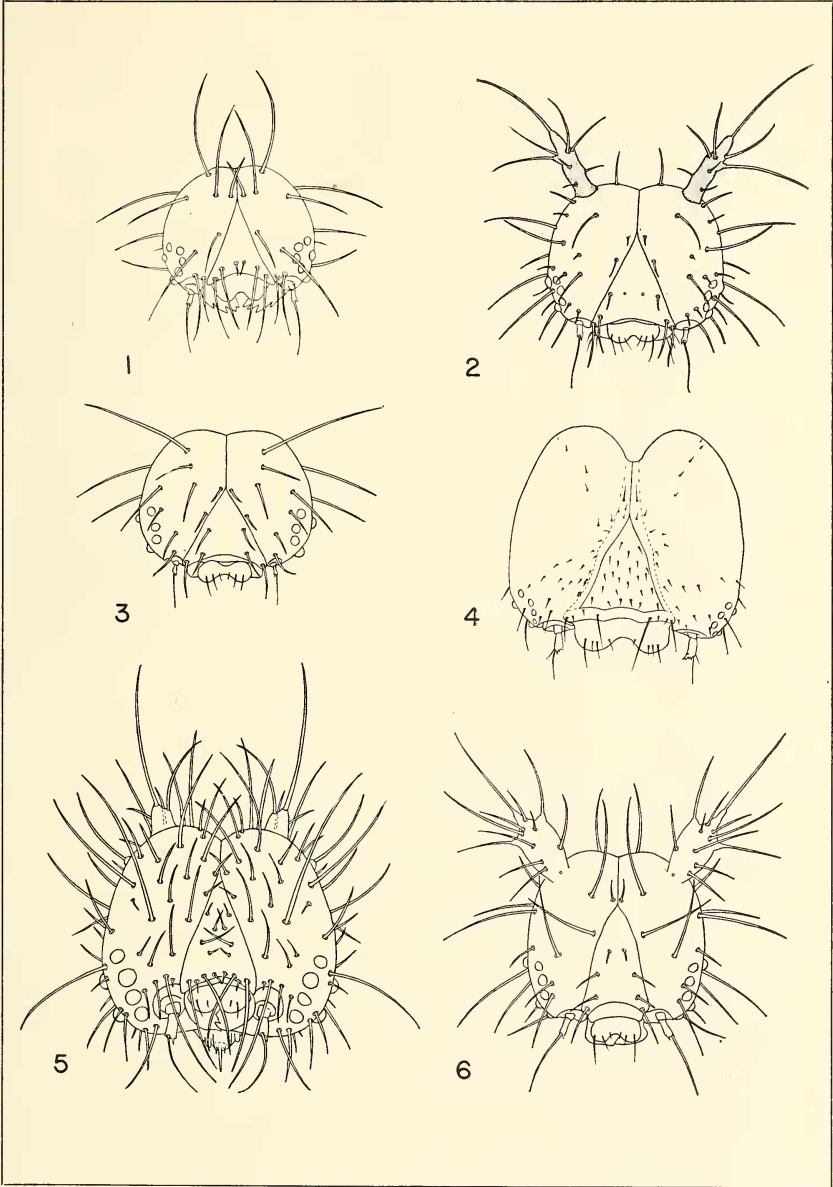
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EXPLANATION OF PLATE V

- Fig. 1. Head of first instar larva of *Precis zonalis* Felder & Felder. Approximately x 58.
- Fig. 2. Head of second instar larva of *Anartia lytrea chrysopelea* Hbn. Approximately x 33.
- Fig. 3. Head of first instar larva of *Anartia jatrophi jamaicensis* Moesch. Approximately x 65.
- Fig. 4. Head of last instar larva of *Eumæus atala* Poey. Approximately x 14.
- Fig. 5. Head of third instar larva of *P. zonalis* Felder & Felder. Approximately x 40.
- Fig. 6. Head of second instar larva of *A. jatrophi jamaicensis*. Approximately x 48.

EXPLANATION OF PLATE VI

- Fig. 1. Prothoracic segment of first instar larva of *Anartia jatrophi jamaicensis* Moesch. showing the arrangement of the setæ dorsal to the subventral fold. A, anterior; P, posterior. Approximately x 100.
- Fig. 2. Fourth abdominal segment of first instar larva of *A. jatrophi jamaicensis* Moesch. showing the arrangement of setæ I to V. A, anterior; P, posterior. Approximately x 100.
- Fig. 3. Prothoracic segment of first instar larva of *Anartia lytrea chrysopelea* Hbn. showing the arrangement of the setæ dorsal to the subventral fold. A, anterior; P, posterior. Approximately x 66.
- Fig. 4. Fourth abdominal segment of first instar larva of *A. lytrea chrysopelea* Hbn. showing the arrangement of setæ I to V. A, anterior; P, posterior; S, subventral fold. Approximately x 90.
- Fig. 5. Prespiracular spine from the prothoracic segment of fourth instar larva of *A. lytrea chrysopelea* Hbn. Approximately x 66.
- Fig. 6. Para-dorsal spine from the first abdominal segment of second instar larva of *A. jatrophi jamaicensis* Moesch. Approximately x 66.
- Fig. 7. Para-dorsal spine from the first abdominal segment of fourth instar larva of *Precis zonalis* Felder & Felder. Approximately x 40.
- Fig. 8. Para-dorsal spine from the second thoracic segment of fourth instar larva of *A. lytrea chrysopelea* Hbn. Approximately x 70.
- Fig. 9. Clypeus of last instar larva of *Eumæus atala* Poey showing the arrangement of setæ. Approximately x 30.
- Fig. 10. Same.
- Fig. 11. Spine from head of third instar larva of *A. lytrea chrysopelea* Hbn. Approximately x 90.



Dethier — Cuban Nymphalidæ and Lycaenidæ

